



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/975,518	10/11/2001	Samir Kapoor	11722US02	9275
7590	10/27/2005		EXAMINER	
McAndrews, Held & Malloy, Ltd. 34th Floor 500 W. Madison Street Chicago, IL 60661			WILSON, ROBERT W	
			ART UNIT	PAPER NUMBER
			2661	

DATE MAILED: 10/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/975,518	KAPOOR ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Robert W. Wilson	2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 11 October 2001.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-5 and 29-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-5 and 29-44 is/are rejected.
- 7) Claim(s) 2-6 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 11 October 2001 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____.   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/11/02</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____.                                   |

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6 & 29-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti (U.S. Patent No.: 5,933,421) in view of Gardner (U.S. Patent No: 5,260,968)

Referring to claims 1 & 29, Alamouti teaches: A multipoint communication system or network per figure 1. The system or network comprises TRANS/RCVR at the Base Station which communicates with remotes (U,V, W, or X) as shown in Fig 1. A, B, C, or D are each a multiple element array which the examiner has interpreted as a group per col. 10 line 57. The purpose of each multiple element array is to receive multiplexed signals that inherently have a carrier frequency per col. 10 line 54.

Alamouti does not expressly call for: said elements being spaced by at least a predetermined minimum group spacing sufficient to obtain spatial diversity or at least one group including multiple element located to proximate to one another and no further apart than a predetermined maximum element spacing to facilitate spatial filtering.

Gardner teaches: elements being spaced by at least a predetermined minimum group spacing sufficient to obtain spatial diversity or at least one group including multiple element located to proximate to one another and no further apart than a predetermined maximum element spacing to facilitate spatial filtering. Per col. 6 line 11-26.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the spacing of Gardner to the communication system or network of Alamouti in order to improve signal reception in a multipath environment.

In Addition Alamouti teaches:

Regarding claims 4 & 32, A,B,C, or D multiple element array or group per col. 10 lines 53-67.

Referring to claims 2 & 30, the combination of Alamouti and Gardner teaches: the antenna of claim 1 and the network of claim 29. The combination of Alamouti and Gardner does not expressly call for: predetermined maximum element spacing is not more than one-half time a wavelength corresponding to the carrier frequency. Gardner teaches: predetermined maximum element spacing is not more than one-half time a wavelength corresponding to the carrier

Art Unit: 2661

frequency per col. 6 lines 1-26. It would have been obvious to add the spacing of Gardner to the array or network of the combination of Alamouti and Gardner in order to maximize spatial resolution.

Referring to claims 3 & 31, the combination of Alamouti and Gardner teaches: the antenna of claim 1 and the network of claim 29. The combination of Alamouti and Gardner does not expressly call for: predetermined minimum group spacing is at least five times a wavelength corresponding to a carrier frequency. Gardner teaches: spacing of many wavelengths per col. 6 lines 1-26. At least five wavelengths is an obvious design choice. It would have been obvious to add the spacing of Gardner to the array or network of the combination of Alamouti and Gardner in order to maximize spatial resolution.

Referring to claims 5 & 33, the combination of Alamouti and Gardner teaches: the antenna of claim 1 and the network of claim 29. The combination of Alamouti and Gardner does not expressly call for: further comprising means for electronically steering. Gardner teaches: steering of beams or means per col. 6 lines 1-26. It would have been obvious to add the steering of Gardner to the array or network of the combination of Alamouti and Gardner in order to maximize spatial resolution.

Referring to claims 6 & 34, the combination of Alamouti and Gardner teaches: the antenna of claim 1 and the network of claim 29. The combination of Alamouti and Gardner does not expressly call for: a switched beam antenna array. Gardner teaches: steering of beams per col. 6 lines 1-26. The examiner interprets steering to a new beam as beam switching. It would have been obvious to add the steering of Gardner to the array or network of the combination of Alamouti and Gardner in order to maximize spatial resolution.

3. Claims 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti (U.S. Patent No.: 5,933,421) in view of Reece (U.S. Patent No: 5,771,024)

Referring to claim 35, Alamouti teaches: An adaptive array architecture for communication comprising A, B, C, or D or a plurality of adaptive arrays controlled by a Base Station per Fig 1.

Alamouti does not expressly call for: array fixation structure or structure for positioning array fixation structure at desired elevation.

Reece teaches: 72 per Fig 6 or array fixation structure and support between 72 and light pole per Fig 6 or array support structure for positioning array fixation structure at desired elevation.

It would have been obvious to add the improved antenna system of Reece to the architecture of Alamouti because the improved system does not require a lot spacing and can easily be deployed in an urban environment.

In Addition Almouti teaches:

Art Unit: 2661

Regarding claim 36, A, B, C, D per Fig 1 each have multiple elements where each element has been interpreted as a subarray per col. 10 lines 53-67.

4. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti (U.S. Patent No.: 5,933,421) in view of Reece (U.S. Patent No: 5,771,024) further in view of Gardner:

Referring to claim 37, the combination of Alamouti and Reece teaches the architecture of claim 36. The combination of Alamouti and Reece do not expressly call for: subarray are spaced sufficiently to obtain spatial diversity. Gardner teaches: subarray are spaced sufficiently to obtain spatial diversity per col. 6 lines 1-26. It would have been obvious to add spacing of Gardner to the architecture of the combination of Alamouti and Reece in order to improve signal reception in a multipath environment.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 38 & 39 rejected under 35 U.S.C. 102(B) as being anticipated by Paulraj (U.S. Patent No.: 5,345,599).

Referring to claim 38, Paulraj teaches: Figure 5 which is a signal receiver. Antennas 1-m are adaptive arrays for receiving from Transmitters 1-d or remote units. 92 per Fig 5 is a plurality of demodulators. Spatial filters 89 are another name for beamformers and 98 per is the combiner or spatial combiner for removing interference

Referring to claim 39, The spatial filter have an inherent arrival processor.

6. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj (U.S. Patent No.: 5,345,599) in view of Gardner (U.S. Patent No.; 5,260,968)

Referring to claim 40, Paulraj teaches: the receiver of claim 38, Paulraj does not expressly call for: comprising an orthogonal frequency division multiple access unit for segmenting available bandwidth into a plurality of frequency bins for allocation.

Art Unit: 2661

Gardner teaches: comprising an orthogonal frequency division multiple access unit for segmenting available bandwidth into a plurality of frequency bins for allocation per Fig 6 and per col. 3 lines 11-col. 4 line 15 and per col. 16 lines 24-68.

It would have been obvious to add the access unit of Gardner to the receiver of Paulraj in order to more efficiently use bandwidth.

7. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (U.S.

Patent No.: 5,260,968) in view of Bossard (U.S. Patent No.: 5,983,078)

Referring to claim 41, Gardner teaches a method for reducing signal interferences via adaptive spatial filtering per Fig 6. The method comprising assigning a subchannel or frequency bin to a user in a transmission channel band and another subchannel to a user in a receive band or assigning a frequency bin to a different frequency per col. 16 lines 49-68. It would have been The method utilizes spatial filtering in order to locate the direction of arrival of the channel or frequency bit as well as assigning a channel or frequency band to a user per col. 3 lines 10-col. 4 line 15 and per col. 13 line 45-col. 16 line 68.

Gardner does not expressly call for: spacing the channels or frequency bands in order to reduce inter-bin interference.

Bossard teaches: spacing adjacent channels or frequency bands so that the intermodular distortion is eliminated per col. 1 lines 55-col. 2 line 46 and per Figure 6.

It would have been obvious to add the channel spacing of Bossard to the method of Gardner in order to eliminate intermodular distortion.

8. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (U.S.

Patent No.: 5,260,968) in view of Ward (U.S. Patent No.: 6,104,930)

Referring to claim 42, Gardner teaches: a method for suppressing or avoiding interference via adaptive spatial filtering per Fig 6. The reference teaches that the available bandwidth is partitioned into a transmit band (1st block) and a receive band (2<sup>nd</sup> block). The transmit channel is divided into sub channels or frequency bins. The receive channel is divided into sub channels or frequency bins also. A user is assigned to a sub channel or frequency bin in the receive channel or block per col. 16 lines 49-68.

Gardner does not expressly call for: using spatial information to distribute said bins within said frequency blocks

Art Unit: 2661

Ward teaches: using spatial information to distribute signals on different carrier frequencies or bins to different beans or using spatial information to distribute said bins within said frequency blocks per col. 3 line 34-col.5 line 21.

It would have been obvious to add the spatial distribution of Ward to the method of Gardner in order to more efficiently manage the assignment of channels which results in improved quality.

Referring to claim 43, Gardner teaches: a method for allocating communication bandwidth per col. 16 lines 49-67. The reference teaches a first user is assigned a subchannel or frequency bin in the receive band and another subchannel or another frequency bin is assigned in a different sub channel or different frequency bin. A 2<sup>nd</sup> user is assigned a different subchannel or frequency bin in the receive band and another or different subchannel or frequenc bins in the transmit band. Per col. 16 lines 49-68.

Gardner does not expressly call for: different direction of arrival for user bands but teaches that spatial channels are utilized for different user bands per col. 3 line 11-col. 4 line 15.

Ward teaches: different direction of arrival for user bands per col. 3 line 34-col. 5 line 21.

It would have been obvious to add the spatial distribution of Ward to the method of Gardner in order to more efficiently manage the assignment of channels which results in improved quality.

9. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner(U.S.

Patent No.: 5,260,968) in view Song (U.S. Patent Pub. No.: US 2003/0193917 A1).

Referring to claim 44, Gardner teaches: a method for avoiding interference via adaptive spatial filtering per Fig 6. The available bandwidth is partitioned into a transmit band and into a receive band or plurality of blocks. Each band or block is divided into subchannels or frequency bins. A user is assigned to a subchannel or frequency bin in the transmit and receive bands respectively per col. 16 lines 49-68.

The applicant has broadly claimed using signal power information to distributing said bins within said frequency blocks. Gardner does not expressly call for: using signal power information to distributing said bins within said frequency blocks.

Song teaches: using signal power information to distribute channels per Pgs 1 Para [0016] –Pg 2 Para [0020].

It would have been obvious to one of ordinary skill in the art at the time of the invention to add distribution of subchannels based upon signal power of Song to the method of Gardner in order to lessen the effects of interference when receiving data from a channel which will improve quality of the network.

***Claim Objections***

10. Claims 2-6 are objected to because of the following informalities: The preamble of claims 2-6 is for "The antenna of claim 1" which is confusing. The preamble should be "The communication system of claim 1". Appropriate correction is required.

***Drawings***

11. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings are incomplete because they do not have naming labels next to the number labels on each of the drawings. Also the drawings are handwritten informal drawings which need to be formalized into final form by a draftsman. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

***Double Patenting***

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. Claims 42 & 43 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 16 of U.S. Patent No. 6795. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

Referring to claim 42, claim 16 of U.S. Patent No.: 6,795,424 teaches: method of suppressing interference by spatial filtering as well as assigning frequency bins to a user and using spatial information to distribute bins within the blocks

U.S. Patent No.: 6,795,424 does not expressly call for: partition bands into blocks

It would have been obvious to one of ordinary skill in the art at the time of the invention that it would be necessary to partition the bands into blocks in order to assign bins.

Referring to claim 43, claim 16 of U.S. Patent No.: 6,795,424 teaches a method of allocating bandwidth by assigning a user to a bin and utilizing a spatial processing to assign the bin to a direction.

U.S. Patent No.: 6,795,424 does not expressly call for: assigning a frequency bin to a first remote user and a second frequency bin to a second remote user as well as direction

It would have been obvious to one of ordinary skill in the art at the time of the invention to call assignment of a bin to the first user as first remote user and assignment of a bin to a second user as a second remote user and it would have been an obvious design choice to implement the spatial assignment of the second frequency bin.

14. Claim 41 & 44 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 16 of U.S. Patent No. 6,795,424 in view of Bossard (U.S. Patent No.; 6,795,224).

Referring to claim 41, claim 16 of US Patent No.: 6,795,424 teaches: reducing interference by spatial filtering of frequency bins assigned to a user

U.S. Patent No.: 6,795,424 does not expressly call for: spacing the channels or frequency bands in order to reduce inter-bin interference.

Bossard teaches: spacing adjacent channels or frequency bands so that the intermodular distortion is eliminated per col. 1 lines 55-col. 2 line 46 and per Figure 6.

It would have been obvious to add the channel spacing of Bossard to the method of Patent No.: 6,795,423 in order to eliminate intermodular distortion.

Claim 44 rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 16 of U.S. Patent No. 6,795,424 in view of Ward (U.S. Patent no.: 6,104,930)

Referring to claim 44, claim 16 of U.S. Patent No.: 6,795,424 teaches a method of avoiding interference in communications signals by assigning a user to a bin and utilizing a spatial processing to assign the bin to a direction.

U.S. Patent No.: 6,795,424 does not expressly call for: using signal power information to distribute the bins within the said frequency blocks.

Song teaches: using signal power information to distribute the bins within the said frequency blocks per Pg 1 Para [0016] to Pg 2 Para [0020]

It would have been obvious to one of ordinary skill in the art at the time of the invention to add distribution of sub channels based upon signal power of Song to the method of US Patent No.: 6,795,424 in order to lessen the effects of interference when receiving data from a channel.

### ***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert W. Wilson whose telephone number is 571/272-3075. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chau T. Nguyen can be reached on 571/272-3126. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit: 2661

*Robert W. Wilson*

Robert W Wilson

Examiner

Art Unit 2661

*Bob A. Dunn*

BOB PHUNKULH  
PRIMARY EXAMINER

RWW  
10/5/05